

DETAILED ACTION

Response to Amendment

1. The 35 U.S.C. §102(b) rejection of claims 1-6 and 8-10 as anticipated by U.S. Patent Application Publication No. 2003/0013871 A1 to Mallon et al. (hereinafter 'Mallon') previously made of record in items 2 and 6 on pages 2 and 3, respectively, of the Office Action dated July 10, 2009 (hereinafter 'OA') has been withdrawn in view of Applicant's amendment to independent claim 1 and dependent claim 6 (in the response to OA filed January 8, 2010, hereinafter 'Response'), which limit the hydrophobic compound to sulfate; sulfonate; and an organic acid derivative species, and deletes alkyl halide from the recited Markush group of species for the hydrophobic compound, respectively.

Election/Restrictions

2. A restriction/election of species requirement had been previously presented in items 1-8 on pages 2-5 of the Office Action dated July 3, 2006. Applicant had elected therein (item 8 on page 5), *inter alia*, chitosan as the species for the hydrophilic polymer and alkyl halide as the species for the hydrophobic compound. By limiting the hydrophobic compound upon entry of the current amendment in Response to independent claim 1 to the three species discussed above, and deleting alkyl halide as a species for the hydrophobic compound in claim 6, Applicant has constructively elected

sulfate; sulfonate; and organic acid derivative as the species for the hydrophobic compound for examination.

3. Accordingly, claim 7 has been currently rejoined by Examiner as drawn to an elected species and claims 11-38 had been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim, in accordance with the aforementioned Restriction Requirement/election of species presented in the Office Action dated July 3, 2006. This requirement had been made final in a prior office action.

4. Therefore, claims 1-3 and 5-10 have been examined in the instant action and claims 11-38 remain withdrawn from consideration.

Claim Rejections - 35 USC § 102

5. **The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.**

6. Claims 1, 3 and 5-10 are rejected under 35 U.S.C. 102(b) as anticipated by USPN 3,271,307 to Dickson et al. (hereinafter 'Dickson').

This rejection addresses non-elected species for the hydrophilic polymer but elected organic acid derivative species for the hydrophobic compound.

Dickson discloses branched polyalkylene polyamines that are additives in aqueous fluid compositions for use in drilling/treatment operations for subterranean oil formation applications (particularly in drilling/fracturing oil wells by using pressure as demulsifiers or corrosion inhibitors, see col. 38-44; claim 17), said branched

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polyalkylene polyamines having a backbone base polyamine (or derivative thereof, which are hydrophilic polymers) and an alkylene branch that can be, e.g., butylene (4 carbons) or other homologs, straight-chained or branched. (Col. 1, lines 13-50, particularly, lines 44-46; col. 2, line 16 to col. 3, line 5) These compounds can undergo acylation (to form, e.g., acrylate or methacrylate derivatives); can be reacted with an alkenyl succinic acid derivative (col. 3, lines 50-68; col. 5, lines 8-55; col. 6, lines 43-73); amidification that can provide amino pendant groups (col. 7, line 62 to col. 8, line 24); and/or can undergo alkylation/oxyalkylation (to form, e.g., a polyetheramine that can have a hydrophobic branch having primary, secondary or tertiary amines) with, e.g., an alkylating agent, butylenes oxide or octylene oxide (col. 10, lines 1-16; col. 15, lines 56-66; col. 19, lines 25-59; col. 21, lines 1-23; col. 24, lines 39-53; Table II; Examples 1-3). The alkylating agent can also be an alkyl halide that provides hydrophobically-branched polyamines having alkyl branches of 4, 6 and 18 carbons. (Col. 19, lines 25-59)

Dickson also discloses increasing the molecular weights of these branched polyamines through carbonylation, wherein the carbonyl reactant reacts intermolecularly to act as a bridging means between two or more polyamino monomers/compounds, thus increasing the molecular weight of the polyamines. (Col. 29, lines 5-18)

In Example 5 and Table 6, Dickson discloses examples/results from alkylating a polyamine homopolymer to obtain hydrophobically-modified branched polyamines.

Furthermore, Dickson discloses that these branched compounds have numerous uses in processes involving water flooding in a subterranean formation and have several advantages, such as not forming precipitates, good anti-corrosion properties

and having strong bactericidal action. (Col. 31, line 72 to col. 32, lines 39) These compounds are stable reagents even in the presence of acids and, thus, can be applied satisfactorily to wells that have been acidized with hydrochloric or hydrofluoric acid. (Col. 41, lines 9-20; col. 50, 52-63)

In columns 38-43, Dickson further discloses an example whereby an aqueous treatment solution, having dispersed therein 5-25% by wt. of the aforementioned compounds, can be injected into a well that has been acidized to remove mud sheath from the interior of the well. (Col. 38, lines 48-63; col. 41, lines 10-20 and 50-75; Example on col. 42; claims 1-8) In another Example, Dickson discloses injecting the branched compounds in a treatment solution to fracture the formation. (Columns 43-47) Aqueous formation treatment compositions containing these water-soluble branched polymer compounds can further include clays, weighting agents, gel-forming viscosifiers and/or stabilizers. (Col. 38, line 64 to col. 39, line 11)

Although Dickson may not explicitly disclose all the physical properties of the disclosed branched polymer compounds, or compositions comprising thereof, that are recited in the claims (such as regarding permeability properties) because the water-soluble branched polymers/compositions disclosed by Dickson are encompassed by the water-soluble branched polymers/compositions recited in the method of the instant claims, then they must inherently possess the same physical properties, such as stabilizing a subterranean formation.

Thus, the instant claims are anticipated by Dickson.

7. Claims 1-3 and 5-10 are rejected under 35 U.S.C. 102(e) as anticipated by USPN 7,081,439 B2 to Sullivan et al. (hereinafter 'Sullivan').

Sullivan discloses a method of drilling/treating a subterranean formation including a step for pumping a colloidal suspension of small particles and an aqueous solution comprising a viscoelastic surfactant (VES) and a hydrophobically-modified polymer, wherein the hydrophobically-modified polymer is present at a concentration between approximately its overlap concentration and approximately entanglement concentration, and wherein the colloidal suspension and VES interact to form structures that effectively bridge and block pore throats. (Col. 2, line 43 to col. 3, line 6; col. 3, lines 41-61, particularly, lines 42-45; see, Figures 6 and 7 depicting a plot of the fluid loss mass as a function of time for blends comprising a VES, a hydrophobically-modified polymer and the fluid loss additive.)

Sullivan discloses that the VES can a cleavable viscoelastic surfactant having a head group (pendant) that can be amino ($\text{NR}_1\text{R}_2\text{R}_3^+$) or, zwitterionic ($\text{N}(\text{R}_1\text{R}_2\text{R}_3\text{-COO})$) where R_1 , R_2 and R_3 are each independently hydrogen or a fully or partially saturated, linear or branched, aliphatic chain of at least one carbon atom, possibly comprising a hydroxyl terminal group. (Col. 4, lines 33-64) Further, the hydrophobic-modified polymer can be charged, is soluble in water and has an average molecular weight comprised between 10,000 and 10,000,000 g/mol, wherein said hydrophobically-modified polymer has a principal backbone and, grafted on said principal backbone and pendant hydrophobic chains. (Col. 5, lines 26-51)

Sullivan further discloses that the principal polymer backbone can be a polysaccharide, or a synthetic polymer, such as poly(ethylene-graft-maleic anhydride); a polyacrylamide; a polyacrylate/polyacrylamide copolymer; or a polyamide. (Col. 5, line 52 to col. 6, line 2) The pendant hydrophobic chain can have 12-24 carbon atoms and can comprise amide groups and can include a cleavable or degradable group, such as an amide. (Col. 6, lines 3-11) The concentration of the polymer particles can be 0.1 to 0.5 by weight percent of the composition. (Claims 20 and 21)

A particular hydrophobically-modified polymer that Sullivan discloses as suitable for the aqueous treatment fluid is hydrophobically-modified chitosan, wherein the polymer has undergone acylation, amination and/or alkylation to provide chitosan with cleavable hydrophobic side chains containing organic acid derivative functionality. (Col. 6, lines 12-27)

In Figures 1 and 2, Sullivan depicts results showing the enhance fluid-loss and permeability properties of the aqueous treatment fluid comprising VES and the hydrophobically-modified polymer in comparison with prior art fluid.

Thus, the instant claims, as amended, are anticipated by Sullivan.

Response to Arguments

The 35 U.S.C. §102 Rejection over Mallon (items 2 and 6 of OA)

8. Applicant's arguments in Response with respect to the 35 U.S.C. 102(b) rejection of claims 1-6 and 8-10 as anticipated by Mallon have been considered but deemed

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moot due to the withdrawal of this rejection in view of Applicant's current amendment to the claims in Response limiting the hydrophobic compound to sulfate; sulfonate; and an organic acid derivative species. Mallon does not teach or suggest its modified chitosan having a hydrophobic branch containing a sulfonate, sulfate or organic acid derivative functional group.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN J. FIGUEROA whose telephone number is (571)272-8916. The examiner can normally be reached on Monday-Thursday 8:00-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (571) 272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James J. Seidleck/
Supervisory Patent Examiner, Art Unit 1796

JJF/JS